DOCUMENT RESUME

ED 077 448 HE 004 275

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TITLE	Predicting Success for University Freshmen.
INSTITUTION	Indiana Univ., Bloomington. Bureau of Educational Studies and Testing.
PUB DATE	73
NOTE	11p.; Indiana Studies in Prediction No. 1, Supplement 4
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*College Freshmen; Grade Point Average; *Grade Prediction; *Grades (Scholastic); *Higher Education; *Predictive Measurement
IDENTIFIERS	*Indiana University

ABSTRACT

In the fall of 1961, the Indiana Bureau of Educational Studies and Testing developed a procedure for predicting the first semester grade point average (GPA) on entering freshmen at the Indiana University from a combination of their CEEB Scholastic Aptitude Test (SAT) scores and their high school ranks (HSR). This document is the third revision of the procedure based on the entering freshman class of fall 1972. The basic descriptive data (means and standard deviations of scores) are given in Table 1. Then the SAT scores were maximally weighted with HSR tc produce the most accurate prediction of first semester GPA. This analysis was conducted separately for men and women. (Author/HS)

ED 077448

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Predicting Success for University Freshman

Up-dating of Procedure

INDIANA STUDIES IN PREDICTION

MONOGRAPH NUMBER ONE
Supplement IV

HE 004 275

Bureau of Educational Studies and Testing
INDIANA UNIVERSITY / 1973

ED 077448

INDIANA STUDIES IN PREDICTION: NO. 1

Supplement 4

PREDICTING SUCCESS FOR UNIVERSITY FRESHMEN

by

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Monograph of the

Bureau of Educational Studies
and Testing

INDIANA UNIVERSITY

March, 1973

INDIANA STUDIES IN PREDICTION: NO. 1

Supplement 4

PREDICTING SUCCESS FOR UNIVERSITY FRESHMEN

In the fall of 1961, the Bureau of Educational Studies and Testing developed a procedure for predicting the first semester grade point average (GPA) of entering freshmen at Indiana University from a combination of their CEEB Scholastic Aptitude Test (SAT) scores and their high school ranks (HSR). Due to the changing nature of the freshmen population, the procedure was updated in 1965 and again in 1970. This supplement is the third revision of the procedure based on the entering freshmen class of fall, 1972.

The basic descriptive data (means and standard deviations of scores) are given in Table 1. Then the SAT scores—Verbal, Mathematics and Sum (Verbal + Math)—were maximally weighted with HSR (in decile form) to produce the most accurate prediction of first semester GPA. This analysis was conducted separately for men and women. Results of the analysis are shown in Table 2.

Table 1. Basic descriptive data for the freshman class, 1972. (The range of scores between one standard deviation below the mean up to one standard deviation above the mean includes roughly the middle two thirds of the class.)

	Mean	Standard Deviation
Men (2247 cases)		
SAT-Verbal	486.19	96.94
SAT-Math	539.51	100.13
Sum (Verb. + Math.)	1025.70	176.44
HS Rank (Decile)*	3.40	2.13
GPA (1st sem.)	2.71	.76
Women (2284 cases)		
SAT-Verbal	485.77	95.44
SAT-Math	497.95	95.77
Sum (Verb. + Math.)	983.72	171.90
HS Rank (Decile)	2.59	1.68
GPA (1st sem.)	2.88	.70

*Deciles represent tenths of the class ranking.

Table 2. Relationships between SAT scores, high school rank and the criterion variables of first semester grade point average.

Predictor Variable	Correlation with GPA	% of GPA variance accounted for by each variable in combination
Men (N = 2247)		
SAT - Verbal	.38	14%
SAT - Math.	.39	15%
SAT - Sum	.43	18%
HSR	-.45	20%
Combination I	.51	26%
SAT V		6%
SAT M		6%
HSR		14%
Combination II	.51	
SAT Sum		12%
HSR		14%
Women (N = 2284)		
SAT - Verbal	.42	18%
SAT - Math.	.45	20%
SAT - sum	.48	23%
HSR	-.46	21%
Combination I	.54	29%
SAT V		7%
SAT M		9%
HSR		13%
Combination II	.54	29%
SAT Sum		16%
HSR		13%

For both men and women the weighted combination of SAT Verbal and SAT Math with HSR produced the same multiple correlation as the SAT Sum and HSR. Therefore, the probability tables are based on the weighted combination of Sum and HSR. The formulas for maximally weighting Sum and HSR to obtain the predicted GPA's are given below. The standard error of estimate is also provided. This figure added to and subtracted from the predicted GPA indicates the range within which the student's actual GPA is expected to fall.

Women (N = 2284)

Predicted GPA =

-0.11380(HSR) + 0.00135(SAT Sum) + 1.86132

Standard error of estimate of a GPA = .5889

Men (N = 2247)

Predicted GPA =

-0.11024(HSR) + 0.00120(SAT Sum) + 1.85462

Standard error of estimate of a GPA = .6578

The formulas noted above were used in determining a predicted GPA for each freshman student in the fall of 1972. The predicted grade point averages (PGPA) were then classified into four categories arbitrarily labeled as follows: .00 to 2.00, Q; 2.00 to 2.50, R; 2.50 to 3.00, S; 3.00 and above, T. Their coded PGPA's were used in developing the GPA

probability table (Table 3) and the nomograph for entering this table (Figures 1 and 2).

GRADE POINT AVERAGE PROBABILITY TABLES

Advisers often want to know the chances of success in college for various types of students. Objective predictions of success can be made by and analysis of the achievement of previous freshmen classes. The Bureau of Educational Studies and Testing at Indiana University has periodically revised the prediction formulas for entering freshmen and has provided a procedure which quickly gives a useful estimate of a student's chances of success at various points on the grade point average (GPA) range. Advisers will find the use of Figures 1 and 2 and Table 3 helpful in program selection decisions for students and in gauging student progress during the semester.

DIRECTIONS FOR USE OF THE FIGURES 1 AND 2 AND TABLE 3

Two easily obtainable numbers are needed to use the tables:

1. SAT SUM: this number is obtained by adding the student's SAT V and SAT M scores printed on his advisor's data sheet.
2. DEC: this number is the student's decile rank in his high school class and is printed next to DEC on his data sheet.

On the basis of past performance of freshmen, SAT scores and high school rank have been combined by an optimal weighting procedure

to produce the probability tables. Refer to Figures 1 and 2 corresponding to the student's sex and read up to the point where his SAT SUM intersects with his DEC. (The student's position between the lines may be approximated.) The point at which the two lines intersect will lie in one of the four probability group letter areas Q, R, S, or T. Consider both probability letter groups for borderline cases.

Using the student's probability group letter, refer to Table 3 labeled Achievement Group Distributions in Percent. Read the various probabilities of success for the student in GPA units within the probability letter column appropriate to his sex.

Here is an example: John has a SAT SUM of 1100 (SAT V = 600, SAT M = 500) and a DEC rank of 4, placing him in probability group S. Referring to the group labeled S in Table 3, we see that 9.2 percent of men like John usually get a GPA below 1.00, 23.6 percent usually get a GPA between 1.00 and 2.00, 47.7 percent between 2.00 and 3.00, and 19.5 percent above 3.00.

If additional aid in the use of the prediction procedure is desired, a call may be made to the Bureau of Educational Studies and Testing, 337-1595.

Figure 1. Achievement Categories for MEN

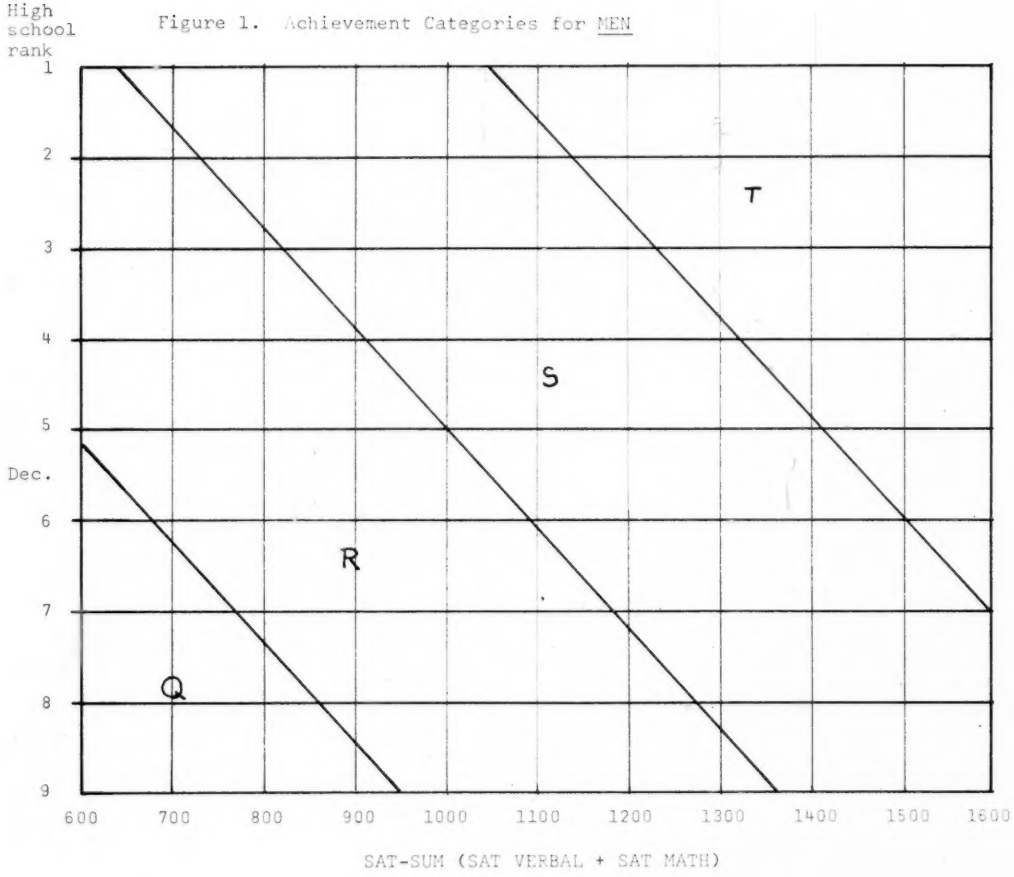

Figure 2. Achievement Categories for WOMEN

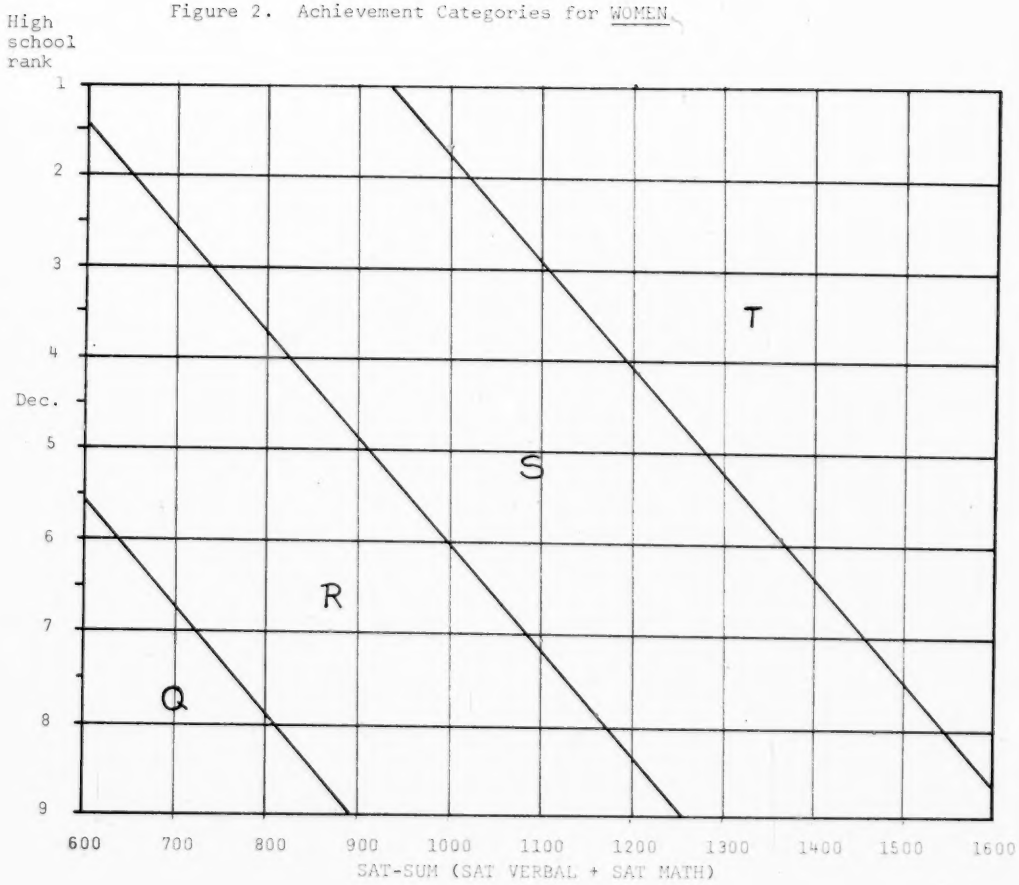

Table 3. Probability table showing percent of actually obtained GPA's in various levels corresponding to predicted GPA categories.

GPA Student Actually Will Get	Student's Predicted GPA Category							
	Q		R		S		T	
	Males %	Females %	Males %	Females %	Males %	Females %	Males %	Females %
4.0	7.7	13.6	6.9	17.1	19.5	32.6	44.4	61.4
3.0	32.1	38.5	43.1	45.1	47.7	44.7	38.7	28.6
2.0	40.5	36.6	36.6	32.1	23.6	15.9	9.0	3.7
1.0	19.7	11.3	13.4	5.7	9.2	6.9	7.9	6.3
.0								
	Q		R		S		T	
Above 2.00	39.8	52.1	50.0	62.2	67.2	77.3	83.1	90.0
Below 2.00	60.2	47.9	50.0	51.8	32.8	22.8	16.9	10.0